Evergreen oaks, which are valuable of greater utility, persist—although a wider interval than in true maquis—but tall shrubs are much less common, and a few seeds of annual bushes and flowers take their place. Because of the more open nature of this vegetation, which rarely exceeds 3 feet in height, perennial plants can develop, and for some weeks after the spring rains, a carpet of flowers and herbs makes a striking display. Geophytes is often inconspicuous, with here patches of red and rock interspersed with plants. (Fisher, 1954, p. 71.) (37)

Mammalian fauna are very sparse indeed, as a matter of fact, as far as the writer knows there is virtually none. Snakes, however, are fairly numerous, are all regarded as being poisonous, and are killed on sight. Small lizards, spiders, six-inch centipedes, snails, scorpions, and large, wood-eating beetles are prominent among the other creatures which were observed. Birds are few, probably because those which venture into the district are generally shot, even if they are as small as sparrows. Flies are numerous, and there are some mosquitoes. (38)

THE DISTRICT OF AL-QURNA

Now that its physical characteristics have been described, the question arises, On what basis can al-Qurnā be considered to be a distinct district? The name, according to several informants, means "corner," and it is the impression of the writer that it is used primarily only by the inhabitants of the district itself. Then, in terms of terrain, it has two features which set it apart from the land immediately surrounding it. It rises particularly sharply and suddenly from the sea, and from the south, say from the hamlet of al-Burj, the ridge upon which Rāshaiyā and Jibbāyā are built looms up distinctly higher than the coastal land, from which it is separated by an escarpment, the Wādī Ba'labīn. These distinctions are, however, rather minor, and, as far as is known, the people themselves do not perceive them. Within al-Qurnā there is little of a physical nature to account for its being set apart as a unit. The land is simply rolling, and the terrain consists, essentially, of three ridges which run roughly at right angles to the shore line. Upon the largest and highest of these, the three northern villages are built. Shaykhān and Mansūf are on the second, middle one; and the third has been commented upon above. Such features are typical of most of the coastal zone from Jūnī to Tripoli. (39)

Al-Qurnā is not a political entity. It is simply a locality in Kisrawān, one of seven districts in the Province of Mount Lebanon which is one of the five provinces into which the Republic is divided. Al-Qurnā does contain six political units, each with its elected mayor and council, as well as its own church. These are the villages of Bsharrā, Ghazzīr, Shaykhān, Mansūf, Jibbāyā, and Rāshaiyā. Lower Bsharrā is merely an adjunct of the village proper. For political purposes, Bakhʿūn is part of Ghazzīr. Hāwī and Ṣarafand belong to Mansūf. Ba'labīn is part of Rāshaiyā. For other than political purposes, the people consider themselves to be seven, rather than six, villages, separating Bakhʿūn from Ghazzīr. Of the seven, (41) (42)

Government regulations provide for the construction of sanitary facilities for every household in the rural areas, but they are not adequately enforced in many villages. The standards of sanitation are often low, particularly in South Lebanon, and pollution of the ground is a common practice. Night soil is frequently utilized as fertilizer, and the consumption of uncooked vegetables contaminated in this manner contributes to a high prevalence of intestinal infections.

Insects and Vectors

Anthropoda, Mosquitoes. To date, 9 species of anopheline mosquitoes have been reported from Lebanon, but only three—*Anopheles superpictus*, *A. sacharovi* (= *A. elutus*) and *A. claviger* (= *A. bifurcatus*)—are of primary concern as vectors of malaria. *A. pulcherrimus*, *A. turgaiti*, *A. algeriensis*, *A. hyrcanus*, *A. multicolor* and *A. maculipennis* have also been identified, but all are rare or localized in distribution.

A. superpictus is widespread and the most difficult to control, since it breeds prolifically in the numerous mountain streams, as well as in pools formed by the overflow from springs, in sand pits and in irrigation canals and seepages, where the water is clear and at least partially exposed to the sun. Larvae are found from April to November, with peaks of prevalence from July to September, in localities below 2,000 feet and over shorter periods at elevations up to 4,000 feet. *A. sacharovi* breeds in swampy areas and along the vegetated margins of pools, streams and neglected irrigation canals and seepages. It is most abundant around the coastal swamps formed by obstructions at the mouths of the rivers and in the marshlands bordering large underground springs in the Bekaa. Like *A. superpictus*, it breeds from April to November, while its prevalence varies with the degree of flooding during the rainy season. The preponderance of both species is influenced to a large extent by the timing and the volume of the winter and the spring rainfall.

A. stephensi breeds in wells, cisterns and other accumulations of water devoid of vegetation, and is often a prominent vector in an area where wells, cisterns and other accumulations of water devoid of vegetation, and is often a prominent vector in an area where towns and villages, particularly in the drier sections of South Lebanon and the Bekaa. It is sometimes associated with A. superpictus in shaded and stagnant stretches of the smaller streams. This species breeds throughout the year, but seldom appears in significant numbers before March or April.

Numerous other types of mosquitoes are present, but, with the exception of Aedes aegypti, they are of no known medical importance. A. aegypti is responsible for the transmission of dengue fever, which occurs in sporadic outbreaks. Several species of Culex have been recorded, including C. molestus (= C. pipiens molestus), the probable vector in occasional cases of filariasis and one of the most annoying pest mosquitoes.

Anopheline control measures are undertaken by several agencies, but up to the present there has been no central governmental program covering all parts of the country. The antimalaria service of the Ministry of Public Health started control operations in the Damour plain, south of Beirut, in 1941. The work, which originally combined swamp drainage and antilarval measures, has gradually been extended, with considerable success, to other portions of the littoral and to limited inland areas, especially in the populous districts to the north and the south of the capital. Larvicidal DDT sprays and residual spraying in the towns and the villages with DDT preparations or Gammexane have been used almost exclusively since 1944.

The New East Foundation, in co-operation with the Ministry and other agencies, carried on an extensive malaria control campaign in the central Bekaa valley from 1947 to 1951, when it closed its headquarters in Lebanon. Anopheline vectors of malaria have been almost eliminated from the Anjar villages and about 300 square miles in the Aamiik swamp region, south of Riyaq. The measures employed included drainage, the

residual spraying of the village houses with insecticides, the treatment of breeding places with larvicides, the stocking of permanent bodies of water with *Gambusia* fish, and the airplane spraying of otherwise inaccessible acreage with DDT preparations. The villages protected in this manner in 1951 had no significant populations of disease vectors.

The United Nations Relief and Works Agency for Palestine Refugees conducts DDT residual spraying programs in camps and villages occupied by refugees under its jurisdiction, especially in the highly endemic coastal areas in the south and in the Jordan plain near the Syrian border. In September, 1951, demonstration projects were initiated by the World Health Organization, in conjunction with the Ministry of Public Health. The program will include systematic surveys in partially controlled and uncontrolled endemic areas, as the Jordan plain, the northern and the southern sections of the Judea, the Ismail coastal area and the more remote villages in the coastal river valleys.

Flies. Flies of the family *Muscidae* are abundant in all parts of the country, and undoubtedly play a significant role in the spread of intestinal and eye diseases. Several species of *Musca* occur, among which *M. domestica vicina* and *M. sorbens* are most prominent. The stable fly, *Stomoxys calcitrans*, and the nuisance variety, *Musca vitabunda*, are also plentiful. Species of *Lucilia* are numerous. The sylvatic-breeding flies, which are serious pests for the livestock and occasionally attack man, include *Chrysomyia albiceps*, *Calliphora erythrocephala* and various species of *Sarcophaga* and *Wohlfahrtia*. The flies most frequently implicated in human myiasis are probably *Lucilia sericata* and *Wohlfahrtia magnifica*.

Several species of sandflies have been identified, including *Phlebotomus papatasii* and *P. sergenti*, vectors of cutaneous leishmaniasis in sections of Israel, and *P. chinensis* and *P. major*, suspected of being vectors in

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[illegible] government's licensing control for the improvement of water supplies was reflected in a diminution in the number of recorded cases from 1,170 in 1937 to a low of 161 in 1939.

The relative prevalence of gastrointestinal forms is uncertain, since the differential diagnosis is seldom confirmed by laboratory examination. Paratyphoid B infections apparently predominate. Cases of paratyphoid B fever are sometimes seen in the hospitals, and, in the opinion of local observers, are typically serious. Salmonella heidelberg (C) is also reported from this region.

Mass immunization with typhoid-paratyphoid A and B vaccine is undertaken by the health officials in all communities from which cases have been notified. Immunization is also carried out routinely each year in the government schools in urban districts and in the child health centers.

Dysentery. Dysentery ranks with typhoid fever as a major public health problem in Lebanon. The insanitary methods of sewage disposal in towns and villages, the abundance of flies and the widespread use of night soil as fertilizer promote the spread of bacillary and amebic infections through contaminated food and water supplies. In the official statistics for the 3 years 1937 and 1940, the deaths listed under the group heading, dysentery, averaged about 11 per cent of the total recorded deaths.*

In a survey reported in 1939,* *Endamoeba histolytica* was identified in from 10 to 30 per cent of the fecal specimens from the inhabitants of three widely separated rural villages in the Lebanon Mountains, the Bekaa and the northern Druzes. Competent authorities in Beirut believe that the carrier rate is normally higher, however, and that it may reach 50 to 75 per cent among the adults in some sections of the population. Acute amebiasis is common, and accounts for about 10 per cent of all the cases of dysentery treated in the local hospitals.

Bacillary infections, a large proportion of

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which are due to gastrointestinal strains are prevalent. Shigella paradysenteriae (Flexner), S. sonnei (Sonne), S. sonnei (Schmitz) and S. dysenteriae (Shiga) are generally isolated in the bacteriological laboratories of the American University hospital, usually in the order given. Enteritis and diarrhea are widespread, particularly among the children in the poorer quarters of the cities and in rural villages, where low standards of sanitation prevail. Bacillary dysentery and other forms of diarrhoeal disease are prevalent throughout the summer months.

Cholera. Cholera has not been reported from Lebanon since 1902. When cholera occurred in Syria in 1947, subsequent to the epidemic in Egypt, preventive regulations were enforced by the Lebanese health authorities, and immunization against cholera was made compulsory. Emergency immunization centers were established in all parts of the country.

Schistosomiasis. Schistosomiasis, the second last of leishmanic infection, caused by *Schistosoma haematobia*, exist in the agricultural districts of the littoral. The most heavily infected foci are found in the irrigated orange and banana growing areas north and south of Beirut, where the environmental conditions favor the development of the larvae. In a survey in 1951-52,[1] infection was present among 70 per cent of the villagers examined in the Kamelia region, near Sidon. The infection rates were consistently high in all age groups, and, although the degree of infection was relatively light, the accompanying anemia was often severe. Comparable conditions among 324 rural inhabitants in the Jedeide-Antilyas district, near Beirut, showed infection in 33 per cent, with rates ranging from 11 per cent in children up to 4 years of age to 44 per cent at 5 to 10 years of age. Small numbers of cases are found in other farming communities in the coastal plain and in the interior. In the villages studied around Tyre and Tripoli, the infection rates did not exceed 5 per cent, while in 3 villages

[illegible]

[illegible] in the Sidon Bay amongst less than 1 per cent.

[illegible] Schistosomiasis appears only to set endemic, but the infection has been disseminated among Palestinian refugees living in camps near Tyre. In the examination of urine specimens from 10 boys, from 4 to 10 years of age, in a school in Tyre in 1950,[1] the eggs of *Schistosoma haematobium* were found in 47 per cent. A second series of urine samples, taken in the same town from 20 refugee boys, from 7 to 14 years of age, revealed eggs in 10 per cent. All the boys were originally from the Safed and the Acre regions in Palestine. The infection was still localized in 1951, as shown by the fact that urine specimens from 1,000 boys enrolled in different schools in the Tyre area were completely negative for *S. haematobium*.[2] No evidence of infection has been found in the course of limited surveys among Lebanese children in the vicinity of Tyre, and the disease was formerly unknown in the local population.

The intermediate snail host, *Bulinus truncatus*, inhabits streams and irrigation canals near Tyre and Sidon, and has been collected from one locality in the middle reaches of the Litany River. It is feared that the disease may become established and spread to the irrigated districts of the coastal plain between Tyre and Sidon.

Taeniasis. Three outbreaks of taeniasis have been recorded—in 1934, 1939-40 and 1945. The second outbreak occurred in Beirut district, where most of the pig farms are concentrated. The number of recognized human cases was small, but in the examination of about 3,000 pigs on several farms in the neighborhood of the slaughterhouse, 15 to 20 per cent were found to be infected with *Trichinella spiralis*. A high rate of infection was also discovered among rats trapped in the area. The mass slaughter of the pigs on the affected farms and the incineration of infected carcasses were ordered by the health authorities. In the 1945 outbreak, 34 human cases, with 2 deaths, were reported, all traceable to infected meat from

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[illegible]

[illegible] Tuberculin in Infants. Among [illegible] were given a positive reaction with Bc. [illegible] alvei and Bc. mallivorix, [illegible] of infection with Bc. suis, as well as with Bc. abortus and Bc. melitensis, are [illegible] owed to the course of routine serological examinations in the Institute de Bactériologie de la Faculté Française de Médecine.

Other Infections. Food poisoning caused by the consumption of cheese and other foods contaminated with toxic strains of Staphylococcus is common.

Diseases Under Control Measures and Surveillance

Tuberculosis. Tuberculosis is prevalent, but the extent of infection is not accurately known. In the 4 years 1950-53, the reported deaths from tuberculosis averaged 324 a year, or roughly 31 per 100,000 population. The validity of such mortality statistics is questionable, however, due to the deficiencies in reporting and the tendency to conceal the presence of infection.

Several tuberculin test surveys have been made on small selected groups of the population, but with considerable variation in results. In 1949, the first representative survey was undertaken in Beirut and the surrounding suburbs by the Ministry of Public Health, in co-operation with the United Nations International Children's Emergency Fund and specialized organizations. From October, 1949, to the middle of March, 1950, tuberculin tests were performed on a voluntary basis on about 40,000 individuals of all ages, 25,000 of whom were subsequently inoculated with BCG vaccine. The proportion of persons giving a positive reaction to tuberculin was estimated at 10 to 20 per cent. Among the schoolchildren, who comprised the largest group, the reaction rate averaged 5 per cent at 6 years of age and 17 per cent at 10 years of age. A comparable series, made up of the persons attending a testing center in one of the poorer districts of Beirut, showed 7 per cent positive reactions among children 6 years of age and 34 per cent at 15 years of age.

In some villages at least 50 per cent of the inhabitants are affected. The disease is encountered less frequently to the north, except in certain congested quarters of Beirut and Tripoli, which house large numbers of workers from the south. In most areas, a higher rate of infection prevails among the Muslim communities than among the Christians. According to the statistics of the Ministry of Public Health, the incidence has increased appreciably since 1951, a total of 1,245 cases was reported in 1949, in contrast with over 4,000 cases in 1951. The recorded cases, however, represent a small fraction of the actual prevalence. In a study of roughly 100,000 cases from all parts of the country, undertaken by doctors from the American University of Beirut in 1952,* the infection rates were estimated at 40 per cent in South Lebanon, 10 per cent in the Bekaa, 10 per cent in North Lebanon and 4 per cent in Mount Lebanon. They averaged 3 per cent in Beirut district, but reached 30 per cent in some of the poorer quarters of the city.

Acute conjunctivitis is widespread from June to December, and particularly between August and October, when the flies are abundant. About two thirds of the cases are usually attributed to infection with *Haemophilus conjunctivitidis* (Koch-Weeks bacillus). A large proportion of the remainder are of pneumococcal origin. Cases of gonococcal conjunctivitis are relatively infrequent.

A special hospital for the treatment of trachoma and other eye diseases has recently been established by the health authorities at Tripoli, an important focus of trachoma in South Lebanon. Measures for the improvement of sanitary conditions are also being carried forward in many villages.

Diseases of the Skin. Mycotic infections, especially favus and ringworm of the scalp or the skin, are common. The majority of cases of dermatophytosis are caused by *Achorion schoenleini*, *Trichophyton violaceum* or *T. gypseum*. Lupus is sometimes seen in the dermatology clinics.

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[illegible] bed of rodents positioned in the hillier parts, in sections of the northern and the southern Bekaa and in scattered districts in the Lebanon mountains. A rodents survey, to supplement and correlate the previous studies, and a demonstrative control program were inaugurated in 1955 by the Ministry, in cooperation with the World Health Organization.

[illegible] Bubonic Infections. Lymphadenitis (or glandular) is not endemic, but occasional outbreaks have been recorded, usually during periods of social distress. Infections with this [illegible] common among the inhabitants in the poorer urban and rural districts, and minor epidemics have followed the introduction of the disease from surrounding areas in the Near East. Six cases were reported during the war years 1941-45, and the widespread employment of DDT spray in the camp and the villages has essentially reduced the danger of infection. Murine typhus is indigenous, however. Sporadic cases are observed from all parts of the country, the majority of which occur during the summer months, from July through September. The disease is typically mild, with a comparatively low fatality rate. The usual prevalence is unknown, due to the general confusion in diagnosis and the lack of facilities for laboratory confirmation outside Beirut. The causative agent, *Rickettsia mooseri*, has been isolated from rats captured in Beirut. The rat flea, *Xenopsylla cheopis*, is the vector.

Cases of Weil's [illegible] are sometimes reported, in which the dog tick, *Dermacentor marginatus*, is the probable vector. Since the diagnosis has been established primarily in hospitals in Beirut, the extent and the distribution of the infection are uncertain.

Plague. Serious outbreaks of plague have been recorded in the past, but only sporadic cases have been reported since the early 1930s. The last case, a bubonic infection, was seen in 1947 in a village on the outskirts of Beirut. Many local authorities believe that the infection exists among the wild

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